

Claims

1. A packaging device for packaging a stack of sheet objects that have an attributable monetary value in a container (4), comprising:
 - 5 an output port (8; 89) for supplying sheet objects (2) to be stacked in the container,
 - a docking mechanism (5,6; 88) to receive the container, so that an opening in the container can receive the sheet objects from the output port,
 - a drive mechanism (32,33,39-41) for driving the sheet objects to the
 - 10 output port, and for supplying the sheet objects through the opening into the container to be stacked therein, and
 - a sealing device (50) to seal a closure member (9) onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects within the container such that the sealed container cannot be opened
 - 15 without rendering it subsequently unusable for packaging sheet objects in the packaging device.
2. A device according to claim 1 including a printer (51) to print data relating to the sheet objects supplied into the container.
- 20 3. A device according to claim 2 wherein the printer (51) is operable to print the data onto the closure member (9).
4. A device according to claim 3 wherein the printer (51) is operable to
- 25 print the data onto a side of the closure member (9) that after sealing is on the inside of the container.
5. A device according to any preceding claim including an input path (30) for the sheet objects, the drive mechanism (32,33,39-41) being operable to drive
- 30 the sheet objects along the input path with their major faces extending along the path, to the output port (8; 89), and to drive the sheet objects in a direction

transverse to their major faces through the output port into the container (4), whereby to create a stack of the sheet objects in the container.

6. A device according to any preceding claim including first input port (3) to receive the sheet objects, and a second input port (10) to receive the closure member, the drive mechanism being operable to drive the objects and the closure member to the output port.

7. A device according to claim 5 or 6 including a main body (5; 87) and an openable frame (6, 88) mounted on the main body, the frame including said output port (8; 89) and being configured so that when opened the container (4) can be fitted in the output port on the frame and then when mounted to the main body the container is retained between the frame and the main body.

8. A device according to claim 7 wherein the input path (30) extends between the frame and the main body.

9. A device according to claim 7 or 8 wherein the sealing means comprises an electric heater (50) on the main body or the frame.

20

10. A device according to any preceding claim including a sensor (34) to sense sheet objects and counting circuitry (35) to count them.

11. A device according to any preceding claim including discrimination (35) circuitry to discriminate between true and false sheet objects.

25

12. A device according to claim 11 wherein the discrimination circuitry (35) is operable to determine the monetary value attributable to true sheet objects.

13. A device according to any preceding claim including a spring loaded platen (18,21; 65) to compress stacked sheet objects in the container.

30

14. A device according to claim 13 wherein the spring loaded platen (65) is within a loading box attached to the docking mechanism.
15. A device according to any preceding claim and including the container
5 (4).
16. A device according to claim 15 wherein the container (4) comprises an opening (11) to receive the sheet objects, a base (18), sidewalls (13-16) extending towards the opening from the base, support rails (19,20) coupled to the side walls
10 on opposite sides of the opening, past which in use the sheet objects (2) resiliently deform when placed in the container in a stacked configuration through the output port (8).
17. A device according to claim 16 wherein the support rails each include a
15 main guide surface (23) to guide a side edge region the sheet members along the input path, and stop regions (24; 74-77) for providing a stop against which the stack of sheet objects abuts when in the container.
18. A device according to claim 16 or 17 including a spring (17) in the base
20 (12) operable to urge stacked sheet objects in the container against the support rails, the container being configured to receive the closure member sealed thereto over the opening.
19. A device according to claim 18 wherein the base (12) is integral with the
25 sidewalls (13-16) and resiliently coupled thereto to provide the spring.
20. A device according to claim 16 or 17 wherein the sidewalls have a concertina configuration.
- 30 21. A packaging system for packaging a stack of sheet objects that have an attributable monetary value, comprising
(i) a packaging device comprising:

an output port (8; 89) for supplying sheet objects (2) to be stacked in a container (4),

a docking mechanism (5,6; 88) to receive the container (4), so that an opening in the container can receive the sheet objects from the output port,

a drive mechanism (32,33,39-41) for driving the sheet objects to the output opening, and for supplying the sheet objects through the opening into the container to be stacked therein, and

a sealing device (50) to seal a closure member onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects within the container

(ii) at least one container (4) configured to be filled with a stack of sheet objects by the packaging device, and

(iii) a closure member (9) to be sealed by the sealing device onto the container.

22. A container (4) configured for use in a packaging system as claimed in claim 21.

23. A container (4) for packaging sheet objects (2) with an attributable monetary value, comprising an opening (11) to receive the sheet objects, a base (12), sidewalls (13-16) extending towards the opening from the base, support rails (19,20) coupled to the side walls on opposite sides of the opening, past which in use the sheet objects resiliently deform when placed in the container in a stacked configuration, the container being configured to receive a closure (9) member sealed thereto over the opening so that the container cannot be reused for stacking sheet objects once opened.

24. A container according to claim 23 wherein the support rails (19,20) are hinged on opposed ones of said sidewalls for movement from a storage position exteriorly of the opening, to an operative position within the opening.

25. A container according to claim 24 wherein the support rails comprise wings (19,20) coupled by integral hinges (26; 73) to a lip (7) around the opening (11).
- 5 26. A container according to claim 25 wherein the hinges comprise spaced hinge regions (73) that hold the wings spaced from the lip.
27. A container according to claim 26 wherein the lip includes raised portions (7', 7'') between the hinge regions (73) that are coplanar with the upper
10 side of the wings when in said operative position.
28. A container according to any one of claims 23 to 27 wherein the support rails each include a main guide surface (23) to guide a side edge region the sheet members to be stacked within the container, and stop regions (24; 74-77) for
15 providing a stop against which the stack of sheet objects abuts when in the container.
29. A container according to claim 28 wherein the stop regions comprise castellations (24).
20
30. A container according to claim 28 wherein the stop regions comprise channels (74-77) in the support rails.
31. A container according to any one of claims 23 to 30 wherein the base
25 (12) is integral with the sidewalls (13-16) and resiliently coupled thereto to provide a spring operable to urge stacked sheet objects in the container against the support rails.
32. A container according to any one of claims 23 to 31 wherein the
30 sidewalls are arranged in a concertina configuration.

33. A container according to any one of claims 23 to 32 including a platen (18,21) on the base, the platen being configured to receive the stack of sheet members.

5 34. A container according to any one of claims 23 to 33, integrally moulded.

35. A container according to claim 34, integrally moulded in a plastics material.

10 36. A container according to claim 33 wherein the platen comprises a discrete element (21) on the base.

37. A container according to claim 33 wherein the platen (18) is integral with the base.

15

38. A container according to claim 33 wherein the base includes a plurality of platen portions (21a,21b) each resiliently biased towards the support rails.

20 39. A container according to any of claims 23 to 38 wherein a plurality thereof can stack one within the other.

40. A container according to any one of claims 23 to 39 and including the closure member (9).

25 41. A container according to claim 40 and including the closure member sealed to the opening.

42. A container according to claim 41 wherein the closure member has been heat-sealed thereon.

30

43. A container according to 40, 41 or 42 wherein the closure member includes a line of weakness (53) along which it can subsequently tear to facilitate removal of the sheet objects.

5 44. A container according to any one of claims 23 to 43 containing a stack of said sheet objects (2).

45. A container according to claim 44 wherein the sheet objects comprise banknotes or like promissory notes of attributable monetary value.

10

46. A container according to claim 44 or 45 wherein data relating to said stack of sheet members (52) is printed on the closure member.

15 47. A container according to claim 46 wherein the data is printed on the inside of the closure member.

48. A container according to any one of claims 23 to 47 with a RFID device.

20 49. A device for removing sheet objects from a container according to any one of claims 23 to 48 including a support (56) for the container around the periphery of its opening, ram (58) to apply a force to the base (12) to drive it towards the opening (11) and to collapse the side walls (13-16) and cause the sheet objects to burst open the closure member (9) so that the sheet objects move out of the container through the opening.

25

50. A method of removing sheet objects from a container according to any one of claims 23 to 48 including applying a force to the base of the container to drive it towards the opening and cause the sheet objects to burst open the closure member so that they move out of the container through the opening.

30

51. A packaging device for packaging a stack of sheet objects that have an attributable monetary value in a container, comprising:

- 26 -

an output port 98; 89) for supplying sheet objects (2) to be stacked in the container,

a docking mechanism (5,6; 88) to receive the container, so that an opening (11) in the container can receive the sheet objects from the output port,

5 a drive mechanism (32,33,39-41) for driving the sheet objects to the output opening, and for supplying the sheet objects through the opening into the container to be stacked therein, and

a sealing device (50) to seal a closure member onto the container opening whilst held by the docking mechanism so as to seal the stacked sheet objects

10 within the container.

52. A device according to any one of claims 1 to 20 or 51 wherein the sealing device (50) includes a printed circuit heater element (66,70) to be energised by a d.c. heating current.

15

53. A device according to any one of claims 1 to 20 or 51 wherein the docking mechanism includes a hinged frame (6).

54. A device according to any one of claims 1 to 20 or 51 wherein the docking
20 mechanism includes a slidable frame (88).

55. A low voltage heater element (50) comprising a printed circuit board (66) on which is formed a heater element (70) as a printed circuit conductive track.

25